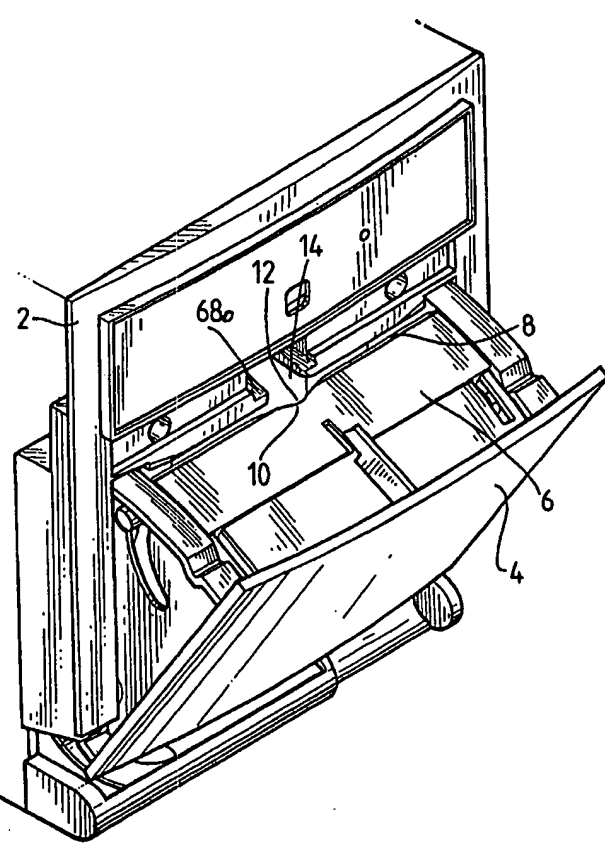




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<p>(54) Title: PACKAGE HANDLING</p> <p>(57) Abstract</p> <p>A beverage dispensing apparatus, for receiving a generally planar filter pack with a flanged nozzle, has a pack handling means which includes a door housing (2), a door (4) pivotable to the housing and upper and lower door flaps (6, 8) pivotable to the door. An interlock mechanism prevents pivoting of the flaps when the door is open to limit the gap into which a filter pack can be inserted. With the filter pack correctly located against the flaps and door, and the door closed, the interlock is released and the filter pack is transferred to a beverage dispensing station within the apparatus.</p> 		

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PACKAGE HANDLING

This invention relates to package handling in beverage dispensing machines, and in particular to the equipment for loading a beverage-producing filter pack 5 into the beverage-dispensing station of such a machine.

A known commercial beverage dispensing system is based on a generally-planar beverage-producing filter pack provided with a flanged nozzle extending from one edge thereof. A filter sheet within the filter pack 10 supports a beverage-producing product such as ground coffee or leaf tea. Such a filter pack is placed in a suitable machine, suspended by the nozzle flange. A hollow injector descends to pierce the nozzle, and hot water is injected into the pack. The beverage exits 15 through a lower edge of the filter pack, the lower edge having been opened by cutting, or self-opening under the pressure of the liquid injected therein. Such filter packs are described in GB-A-2121762, EP-A-0179641, and EP-A-0247841.

20 In a current commercial version of the beverage dispensing machine which takes these filter packs, a vertically-oriented door is pivotable along its lower edge to expose a mouth at the upper edge to receive the filter pack. When open, the door is at about 30° to the 25 vertical and exposes an inwardly-extending flap adjacent its upper edge. The flap is pivotable relative to the door and is spring-biased so that it can move from a normal position when it is orthogonal to the door to a position (against the spring bias) when it is near 30 parallel to the door.

The user opens the door by pressing a beverage select button. The open door exposes the flap which has a slight notch in the centre of its edge, adjacent an entry port leading, as a channel, to the beverage 35 dispensing station. There is only a small gap between

the flap edge and the entry port. The user inserts a filter pack into the machine, nozzle upwards, against the edge of the flap. The latter pivots downwardly to allow the filter pack to enter the gap. Once the pack upper  
5 edge passes the pivoted flap, the latter springs back upwardly to trap the flange of the nozzle between the flap notch and the entry port. The user closes the door and the filter pack is urged through the entry port to the beverage dispensing station. This is accomplished by  
10 the nozzle flange being supported on and being urged along the channel by the flap as the door closes. When closing, the flap passes beneath the entry port and channel and brings the nozzle to rest at the exact position where the water injector descends. Beverage  
15 dispensing then takes place.

Human nature being as it is, users can be careless or malicious and have been known to try to insert filter packs upside down, or to push them well beyond the flap so that they drop into the interior of the machine. The  
20 present invention is concerned with an improvement to the pack loading system at the door, which is intended to be less susceptible of abuse.

According to the present invention there is provided a beverage dispensing apparatus having a package handling  
25 means as specified in the claims hereinafter.

Preferred features of the invention will now be described, by way of example, with reference to the accompanying drawings, in which:-

Figure 1 is a perspective view, partially cut away,  
30 showing a beverage dispensing apparatus according to the invention with the assembled package handling means;

Figure 2 is a perspective view, from the front and to one side, of the door housing used in the apparatus of Figure 1;

35 Figure 3 is a perspective view, from the rear and to

one side, of the door used in the apparatus of Figure 1;

Figure 4 is a front perspective view of an upper door flap used in the apparatus of Figure 1; and

Figure 5 is a front perspective view of a lower door flap used in the apparatus of Figure 1.

Referring to Figure 1, the package handling means is designed to receive a filter pack of the type already described. It comprises a door housing 2, a door 4 (shown in the open position ready to receive a filter pack), an upper door flap 6, and a lower door flap 8. Only the inner edge of flap 8 can be seen in Figure 1. The centres of the inner edges of flaps 6 and 8 have a notch 10, 12 respectively which rest closely adjacent an entry port 14 which acts as a channel for the filter pack nozzle flange, leading into the machine to a beverage dispensing station (not shown).

Referring to the remaining drawings, the door housing 2 has a pair of inwardly-projecting stub axles 16 and camming walls 18 (one of each of which can be seen in Figure 2).

The door 4 (Figure 3) has a main wall 20 from which project a pair of wings 22. The wings 22 have camming slots 24, stops 26, bores 28 and bearing walls 30. When assembled to the door housing 2, the wings 22 project inwardly of the apparatus with the bearing walls 30 resting on the stub axles 16. The door 4 is therefore able to pivot about axles 16 from a closed position flush against the door housing 2 to the open position shown in Figure 1. A detent 32 on the wings 22 of the door 4 limits the degree of opening whereas troughs 34 interlink with a latch mechanism on the door housing (not shown) to maintain the door closed until use. The door 4 is spring-biassed against the door housing by springs (not shown).

Extending between wings 22 and from the main wall 20

is a ledge 36 having slots 38. From the inner edge of each slot 38 a wall 40 extends downwardly, and also outwardly from the main wall 20. Each wall 40 has a slot 42. At the centre of the ledge 36 is disposed a thrust arm 44.

Referring to Figure 4, the upper door flap 6 has a pair of stub axles 46 which are received within bores 28 in the wings 22 of the door 4. Extending upwardly from the stub axles 46 are a pair of wings 48 joined by a web 50. Each wing 48 has an outwardly extending slot 52 and between the top of each wing 48 extends a wall 54 having a slot 56 and the previously-mentioned upper door flap notch 10.

When assembled to the door 4 with stub axles 46 in bores 28, the upper door flap 6 can pivot between the main wall 20 of the door 4 and the stops 26 on wings 22. A leaf spring (not shown) acts between web 50 and wall 40 of the door to bias the upper door flap 6 inwardly of the machine. Wall 54 lies above ledge 38 with thrust arm 44 accommodated in slot 56 in flap 54. The wings 48 are accommodated in slots 38 in ledge 36 of the door.

Referring to Figure 5, lower door flap 8 has a pair of cranked lever arms 58 and the previously-mentioned lower flap notch 12. When assembled to the door 4, the inner ends 60 of the cranked lever arms 58 are accommodated in slots 42 of wall 40 and the outer ends 62 of the cranked lever arms 58 are accommodated in camming slots 24 in wings 22 and bear against camming walls 18 of door housing 2. When both assembled with the door 4, the lower door flap 8 nestles below upper door flap 6. Slots 52 in the upper door flap accommodate the inner ends 60 of cranked lever arms 58. A pair of coil springs (not shown) extending around the inner ends 60 of the cranked lever arms 58 act against the door and bias the lower door flap upwardly against the lower surface of the upper

door flap 6. This ensures that when the door 4 is opened, the upper and lower door flaps 68 have the disposition shown in Figure 1.

The wall 54 of upper door flap 6 has a downwardly projecting lip 64 along its inner edge (Figure 4). The lower door flap 8 has a pair of upwardly-projecting tongues 66 (Figure 5). When the door is open and the lower door flap 8 is biased upwardly against the lower surface of upper door flap 6, the tongues 66 are held against lip 64 to cause an interlock between flaps 6 and 8.

The apparatus operates as follows, commencing with the door 4 being latched closed in a vertical position. The user presses a beverage select button which causes a thrust arm (not shown in the drawings) to push the door outwardly, releasing the latches with troughs 34. This causes the door to open to the position shown in Figure 1. There is then just a small gap between the notches 10,12 and the entry port 14: insufficient for a user to be able to insert a filter pack upside-down, i.e. with the nozzle flange downwardly. The gap is just sufficient for the user to insert the generally-planar filter pack correctly, with the nozzle uppermost. The user inserts a filter pack into the gap with the face of the pack bearing against the inner edge of the lower door flap 8. This pushes the lower door flap 8 downwardly to disengage the interlock between tongues 66 and the lip 64 of the upper door flap 6. The user continues to insert the filter pack until the flange of the pack nozzle rests on top of the wall 54 of upper door flap 6, adjacent notch 10. Because the lower door flap 8 is now adjacent the neck of the pack nozzle rather than the bulkier planar pack itself, the flap 8 springs back upwardly to re-engage the interlock with the upper door flap 6. The user cannot therefore increase the width of the gap into

which the filter pack has been inserted. In consequence, it is not possible to force the filter pack further into the machine. The nozzle flange cannot be forced past wall 54 and the filter pack cannot therefore be caused to drop further into the machine.

The user then closes the door 4 by pressing main wall 20 inwardly. As the door closes the outer ends 62 of cranked lever arms 58 (of lower flap 8) come into contact with and are forced by camming walls 18 down camming slots 24 in the wings 22 (of door 4). This releases the interlock between flaps 6 and 8 again. In Figure 1, with the door fully open, one of the outer ends 62 can be seen at the top of camming slot 24. As the door is further closed, the lower face of the lower door flap 8 contacts the upper edge of web 50 and causes the upper flap 6 to move away from stops 26 on the door and in a direction towards main wall 20 of door 4. This is against the bias of the leaf spring between the upper flap 6 and the door 4. As the door continues to close, the upper flap 6 passes under the entry port 14 and the thrust arm 44 on ledge 36 of the door urges the flange of the nozzle on the filter pack into the entry port 14 so as to rest on the channel 68 formed thereat (see Figure 1). When the door is fully closed, the door latching mechanism interlocks with troughs 34 on door wings 22. The thrust arm 44 holds the filter pack nozzle at the correct position directly below a hollow water injector at the beverage dispensing station (not shown), and the beverage dispense cycle commences.

After the beverage has been dispensed, the machine automatically discards the spent filter pack by a mechanism forming no part of this invention.

When the next user presses a beverage select button to cause the door to spring open, the camming action between the outer ends 62 of cranked lever arms 58,



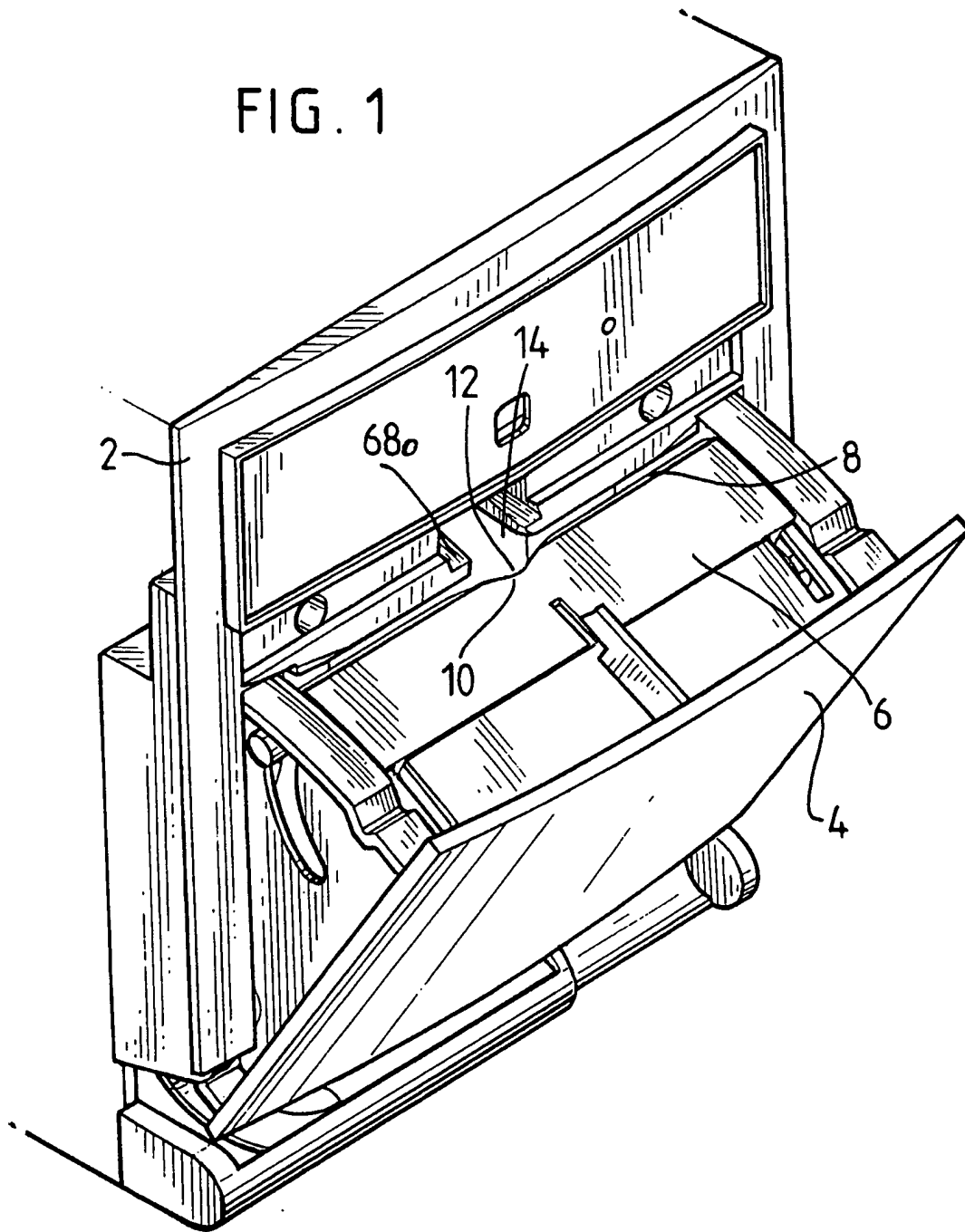
camming slots 24 and camming walls 18 is reversed. This is aided by the upward bias provided by the spring loading to lower flap 8 and the bias provided by the leaf spring between the upper flap 6 and door 4. This resets  
5 the interlock between upper and lower flaps 6, 8 when the door is fully open. A new filter pack can then be inserted.

## CLAIMS:-

1. A beverage dispensing apparatus for receiving a generally planar filter pack, said apparatus having a pack handling means which comprises:
  - 5 a door housing;  
a door mounted on the door housing and pivotable along a horizontal axis relative to the door housing;  
an upper door flap mounted on the door and pivotable along a horizontal axis relative to the door, the upper  
10 door flap having an upper wall for receiving a flange of a nozzle of the filter pack;  
a lower door flap mounted on the door and pivotable along a horizontal axis relative to the door;  
interlock means for locking the pivoting movement  
15 between the upper door flap and the door and between the lower door flap and the door when the door is fully open, with inner edges of the upper and lower door flaps adjacent in the locked position; and  
means for releasing the lock as the door is closed  
20 relative to the door housing to enable the lower door flap to pivot relative to the door and the upper door flap to pivot relative to the door.
2. An apparatus according to claim 1 wherein the door has a pair of inwardly extending wings, at least one  
25 of which wings has a camming slot which receives a cranked lever arm mounted on the lower door flap.
3. An apparatus according to claim 2, in which the door housing has a camming wall which cooperates with the cranked lever arm as the door is closed.
- 30 4. An apparatus according to any of claims 1 to 3 wherein the door has a thrust arm to bear against the flange of the filter pack nozzle as the door is closed.
5. An apparatus according to any of claims 1 to 4 wherein the interlock means includes a downwardly-  
35 extending lip on the upper door flap and an upwardly

extending tongue on the lower door flap, which tongue bears against the lip in the locked position.

FIG. 1



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FIG. 2

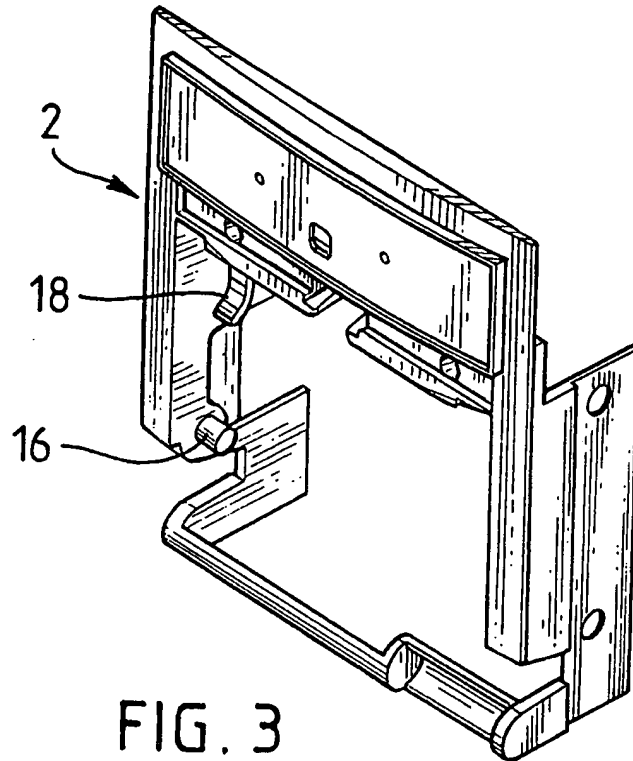


FIG. 3

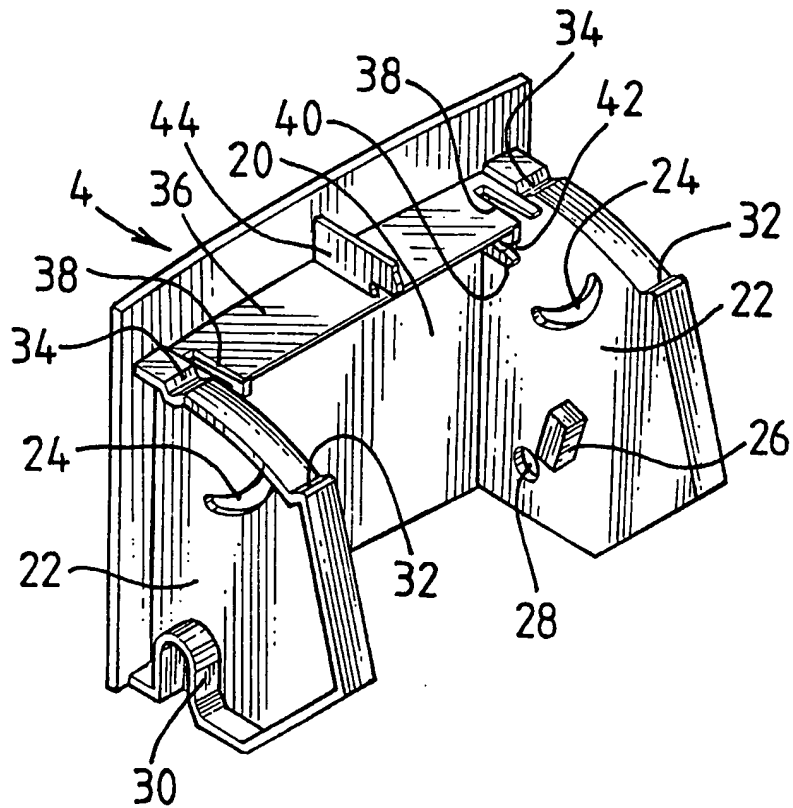


FIG. 4

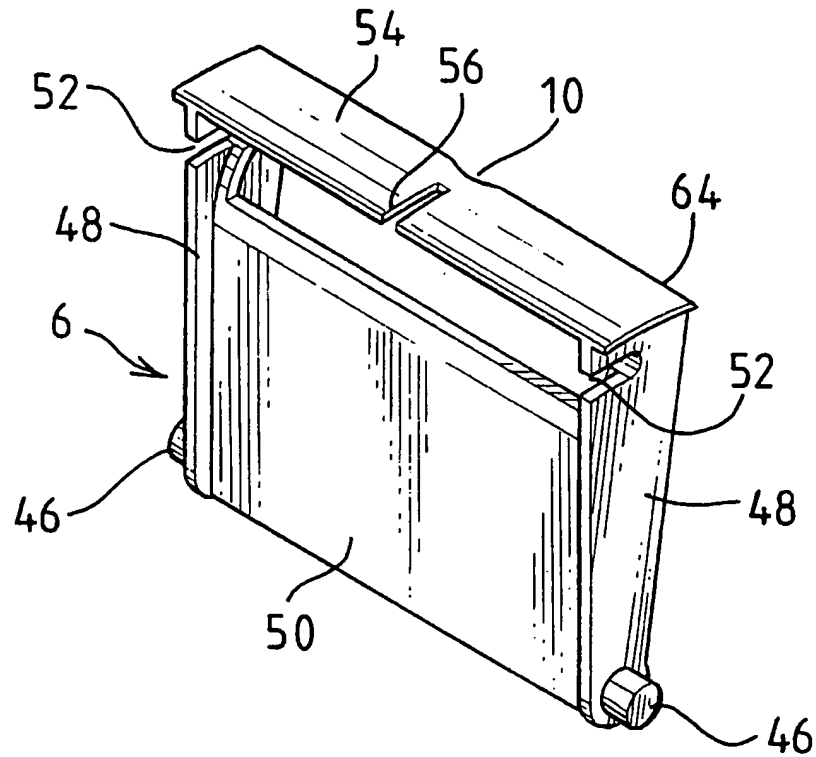
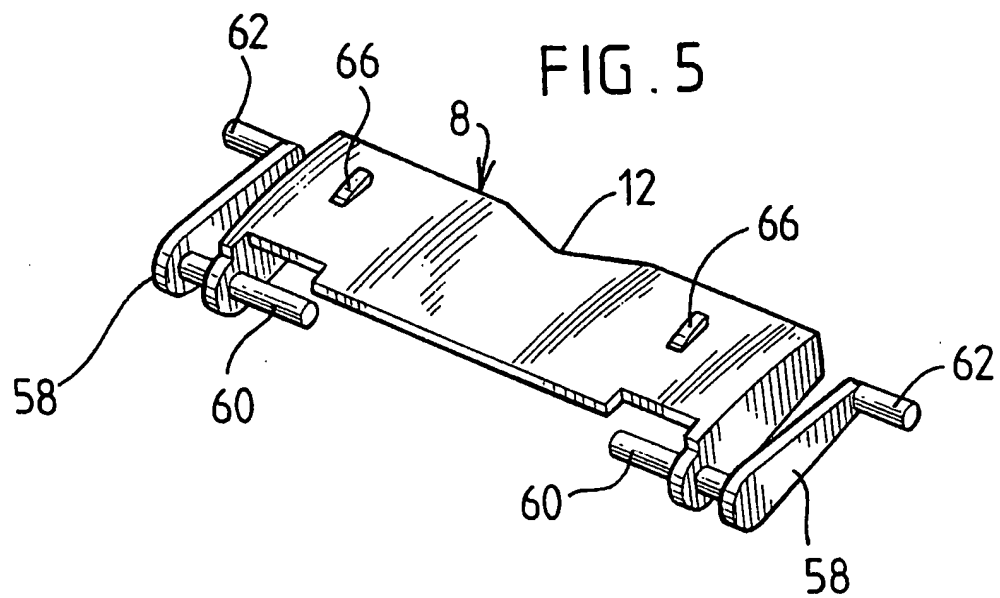


FIG. 5



## INTERNATIONAL SEARCH REPORT

International Application No.

PCT/GB 97/03115

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 6 A47J31/06 A47J31/40

According to International Patent Classification (IPC) or to both national classification and IPC

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## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category <sup>2</sup>	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	GB 2 123 685 A (MARS GB LTD) 8 February 1984 see page 3, line 120 - page 4, line 108; figures 2-4	1-4
A	CA 1 269 690 A (KLEIN) 29 May 1990 see page 10, line 11 - page 13, line 30; figures 2,7-10	1
A	US 3 719 505 A (MAZZA) 6 March 1973 see column 2, line 33 - column 3, line 5; figure 2	1

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